View Space Interaction for Visual Analytics

Applications are invited for a PhD fellowship/scholarship at Graduate School of Science and Technology, Aarhus University, Denmark, within the Computer Science program. The position is available from 1 May 2019 or later.

Research area and project description:
These days, data analysis is no longer this long-winded process that churns on the data until hours later a final result has been computed. With current hardware speedups and new computational paradigms like Progressive Visual Analytics and Approximate Query Processing, a computational analysis run by the machine and an interactive visual exploration performed by the user can be carried out side by side with results of the computation and of the exploration informing each other. This way, a well-run visual data analysis can turn almost into a synchronous collaboration scenario between human analyst and machine.

This PhD project sets out to investigate how to best facilitate this collaboration by developing novel visual interaction techniques for such a closely intertwined computational data analysis and interactive visual data exploration. As computations are used quite differently alongside a running analysis – from silent background processes that once deployed only chime in with new results every now and then (e.g., progressive probes), to visually very present foreground processes that require active direction and steering by the user (e.g., computational smart lenses) different techniques to interact with them will need to be explored.

Research questions to pursue in this project are:

- Which metaphors are appropriate for the otherwise invisible computational process and to which kinds of visualization and interaction do they lead? (e.g., computational analysis as a tool to be used by the analyst, as a resource to be distributed between different analytical objectives, data subspaces, or levels of granularity, as well as an independent helper that can be tasked by the user and reports back when needed)
- Which progressive processes – data transmissions (e.g., streaming data or progressive data loading), analytic computations (e.g., progressive clustering or density estimation), and visualizations (e.g., progressive rendering or iterative layouting) – can be shown and interacted with in which ways?
- Can and should the computational steering be coupled with the interactive visual exploration? For example, a zoom-in on a region of interest in the view could at the same time focus the running computation on that particular data subspace as well. Or should both complement each other, so that if the user looks at some specific data subset, the computational process monitors the remainder of the data for out-of-sight changes?

Work on this PhD topic will be conducted in close collaboration with the DABAI project (https://dabai.dk), which provides the datasets and analysis scenarios on which the developed visualizations are tested.

Department of Computer Science

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Date: 03 January 2019

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Qualifications and specific competences:
To apply for the position, you must have a relevant Master's degree and excellent computer programming skills. Prior experience in at least one of the following areas is of advantage: data visualization, data science, computer graphics, human-computer interaction, or database technologies.

You are expected to bring or develop the necessary soft skills for working in teams, as well as for managing and communicating your research progress. The same holds for the necessary hard skills in software development and scientific writing.

More information online:
http://phd.scitech.au.dk/for-applicants/apply-here/february-2019/view-space-interaction-for-visual-analytics/

Contact:
Applicants seeking further information are invited to contact:

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Application procedures

1)   Find the application form:
Go to http://talent.au.dk/phd/scienceandtechnology/opencalls/
Choose Februar 2019 Call with deadline 1 February 2019 at 11.59 PM MET.
You will be directed to the call, and must choose the program 'Computer Science'.

2)   Fill in the following information:

- Personal information
- Academic background
- Admission
- Financing (if any)
- Study: In the dropdown menu you must choose the project: "View Space Interaction for Visual Analytics "
- Source (how you found out about the call)

Next to some of the information fields you will find a number. Click on the number to get further directions on how to fill in the information field/what information is needed.

3)   Application attachments:

Please be aware that you cannot submit the application if one or several of these documents have not been uploaded.

If you wish to upload more than one document under each section, you must scan/merge all documents into one large PDF file and upload this. Please note that we reserve the right to remove scientific papers, large reports, theses and the like. Instead you can indicate a URL where the information is available.

Please note that all information in the application must be in Danish or English.

As a minimum all applications must include (pdf-files only, max. 20 MB, no zip):

- One reference (template for references)
- Curriculum vitae,
- Motivation (max. 1 page)
- Transcripts and diploma(s)
- Project description (½-4 pages). In the project description, you are asked to outline your own perspective on the project, its challenges, and the research directions you can see yourself taking to solving these challenges. If you wish to, your PDF can also indicate a URL where further information can be found. Please note that we reserve the right to remove scientific papers, large reports, theses and the like.
- Documentation of language skills if required.

After submission of the application, you will receive a confirmation e-mail with an application ID, you should use for reference if needed. The e-mail will also include a link to the application – GSST urges you to check that all mandatory data, marked with an asterisk (*), is registered correctly and all attached files are readable. In case of significant errors, you should reply to the confirmation e-mail with the correct details before the application deadline.

GSST reserves the right to verify the authenticity of your educational diploma and transcripts:

- Request additional information to verify an application.
- Reject the application if it is proven, or if the University has reasonable belief, that the information provided is false or if the applicant refuses to provide the requested information, whether or not an offer has already been made.
- For further information on applying, assessment procedures, etc. please see the GSST application guide here.

Please note: The program committee may request further information or invite the applicant to attend an interview.

All interested candidates are encouraged to apply, regardless of their personal background.